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The Asset Growth Effect and Investor Protection in Emerging Markets: The Role of the Global Financial Crisis

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ABSTRACT: The previous evidence shows that firms experience lower returns after a period with higher growth in assets. Two alternative explanations have been raised to explain this effect: mispricing and optimal investment. This study examines this effect in 26 emerging markets over the period of 2005–2013 with a special attention to the recent global financial crisis. We find a stronger asset growth effect during the crisis years relative to other years. This effect is stronger in firms with small or medium stock turnover ratio and firms operating in industries with low R&D intensity. We also investigate the heterogeneity across countries and find that a stronger asset growth effect during the crisis years exists only for emerging markets with low protection of shareholders and creditors. We argue that this evidence is in line with the mispricing hypothesis.

KEY WORDS: asset growth effect, emerging markets, global crisis, investor protection, mispricing

The asset growth effect refers to stocks experiencing lower returns after a period with higher growth in assets. The literature offers two alternative underlying reasons for the negative relationship between asset growth and future stock returns; mispricing, which is related to overinvestment (Anderson and Garcia-Feijoo, 2006; Cooper, Gulen, and Schill 2008; Titman, Wei, and Xie 2004), and optimal investment (Watanabe et al. 2012) or q-theory (Titman, Wei, and Xie 2013). Mispricing hypothesis suggests that investors misvalue firms' investments when they do not have sufficient information about the managerial behavior. Thus, investors make mistakes in the valuation of higher investments on projects with negative net present values (over-investments). In subsequent periods, investors understand the problem and correct this mispricing, which is associated with lower future returns. Alternatively, the optimal investment hypothesis argues that firms with higher investments are capable of doing so by gaining advantage from having a lower discount rate, which is in turn translated to lower expected rate of returns as an indication of the alignment between investments and the cost of capital.

Most of the previous studies that examine the existence and reasons of the asset growth effect focus on firms in the US markets. Even though there are a few studies using a sample of international markets, research has overlooked this effect for stocks traded in emerging markets. We investigate the asset-growth effect for emerging markets and try to identify the reasoning of this effect if it exists. We are also interested in identifying possible role of a period of the most severe stock markets downturn of last decade, namely the global financial crisis, which started in August 2007 in the United States, in contributing and explaining the asset-growth effect in emerging markets.

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The endogeneity nature of the relationship between the growth in assets and stock market performance makes it difficult to identify whether mispricing or optimal investment hypothesis can explain the asset-growth effect. Mispricing argument underlines inefficient or less efficient pricing while optimal investment supports the idea that shares are efficiently priced on stock markets. Investors in many emerging markets do not have as much access to information as investors in more advanced countries have and fewer analysts follow the equity markets. Furthermore, agency problems are higher because of ineffective legal protection and the regulations are weaker in terms of requirements to disseminate information (La Porta et al. 1998). Since it is commonly assumed that asymmetric information between managers and investors is high in emerging markets, all stocks would be subject to misvaluation. The optimal investment hypothesis relies on the argument about firms being able to raise less costly funds to finance high growth in assets. The recent global financial crisis has characteristics to identify that firms with high growth in assets are hit more severely than other firms because the crisis affected the liquidity level available on the market and investors' level of willingness in accepting risk.

There is also a link between overinvestment and agency problems. Investor protection provided to shareholders and creditors plays an important role in mitigating these problems, not only in comparisons between developed and emerging markets but also across emerging countries. Thus, mispricing (optimal investment) hypothesis should find support in countries with weaker (stronger) protection available for shareholders or creditors.

Our results show no indication of the asset growth effect in our sample of emerging markets when we do our analysis for the full sample period. However, the past asset growth causes further declines in stock returns during the crisis years as the estimated coefficients of the interaction between the variable and the asset growth and the dummy for crisis years are statistically significantly negative. We find support for the mispricing hypothesis in our further analyses. Even though a statistically lower stock returns of firms with higher asset in growth in crisis years indicate that firms with higher financing needs are affected more, the negative relationship between asset growth and future returns during the crisis period is more relevant for stocks with a low and medium turnover ratio and for firms operating in industries with a low ratio of R&D expenditures to total assets. These findings are in line with the mispricing effect because investors evaluate those firms' investments overoptimistically in normal periods when the effect of the asset growth on stock returns is negligible. Furthermore, our major results are held in countries with lower shareholder and creditor protection only.

This study extends the literature on the existence of the asset growth effect by providing evidence from emerging markets in addition to studies providing evidence for the United States and other developed markets. Our analysis sheds more light on whether the mispricing or the optimal investment explanation holds for emerging markets during the 2008 crisis period. We show that the global financial crisis provide opportunities for investors to identify the real value of investment and financing activities in the form of asset growth in those countries that are assumed to have higher agency problems and less efficient stock markets.

The rest of the study is organized as follows: in Section 2, testable hypotheses are developed. Section 3 focuses on the data and methodology and the results are explained in Section 4. Section 5 provides the conclusions of our analysis.

Brief Literature Review and Hypotheses

The Asset-Growth Effect

One of the most important anomalies of stock markets is the negative effect of investment and financing on future stock returns (Loughran and Ritter 1995; Titman, Wei, and Xie 2004). Titman, Wei, and Xie (2004) find that an abnormal increase in firms' capital investment is associated with lower stock returns for five subsequent years and identify this relationship as a separate anomaly in addition to the long-term return reversal and secondary equity issue anomalies. Broussard, Michayluk, and Neely (2005) use data on US firms for the pre-internet period (1981–1995) and different measures

of growth, including asset growth as an indicator of the long-term trend in the success of a firm. Their results show an inverse relationship between past growth rates and future growth rates and holding period returns. This is explained with a competitive market argument indicating that publicly traded companies, which experience high past growth, attract competition that will lower future stock market performance.

One of potential sources for this anomaly is mispricing. In this explanation, investors overvalue the value effects of investments or financing activities because of asymmetric information. Over the next period, investors figure out the mistake they did earlier and then correct it by reducing the stock prices raised previously. Titman, Wei, and Xie (2004), and Anderson and Garcia-Feijoo (2006), and Lam and Wei (2008) provide evidence on the mispricing of lower returns of portfolios created by prior investment growth, and find that portfolios of firms with past higher investment growth underperform those with past lower investment growth when prices do not reflect all available information accurately.

Polk and Sapienza (2009) use a measure of asset growth based on capital expenditures and provide evidence for the negative relationship between individual firms' investment-capital ratios and future equity returns of US public firms over the period 1963–2000. Firms with low abnormal investment due to a deviation of their valuation from their true value have high subsequent stock returns, because of the correction of this overpricing in the future. Moreover, this relation between investment and future returns is stronger for firms with above-median R&D intensity or above-median turnover.

Cooper, Gulen, and Schill (2008) generate a simple and comprehensive measure of total asset growth, which is the annual percentage change in total assets, to understand the sources of the growth effect at the firm level. They argue that total asset growth provides a broader focus than the growth in investment and financing activities can capture. Cooper, Gulen, and Schill (2008) demonstrate that the asset growth does better in predicting future cross-section stock returns relative to any single component of growth, because asset growth is the sum of the sub-components of growth from the left- or right-hand sides of the balance sheet. They provide strong evidence that in the United States during the period from 1968 to 2003, annual risk adjusted stock returns of firms with low asset growth rates are higher than returns of firms with high asset growth rates. Similarly, Cooper, Gulen, and Schill (2010) document a strong asset growth effect for US stocks from 1968 to 2006. The positive difference in risk-adjusted returns between low and high asset growth portfolios is present with either equal or value weighting portfolios and for both large capitalization and small capitalization stocks. This premium in favor of low asset growth stocks is as powerful as other premiums explained by size, book-to-market, and return momentum and reversals. Thus, the evidence provided in these two complementary studies also supports mispricing explanation.

Li, Livdan, and Zhang (2009) demonstrate that many anomalies in the literature are not consistent with mispricing, but with risk differences (q-theory). This theory explains higher level of investments in relation with the cost of capital. Firms increase their investments until the point where the expected return is equal to the expected cost. Thus, the q-theory explains the asset growth effect with an optimal investment argument indicating that firms with higher investments tend to have a lower discount rate and, thus, lower expected returns. Titman, Wei, and Xie (2013) test the asset growth effect to find support for an alternative explanation relying on the q-theory of investments. They show that there is a strong relationship between the asset growth effect and financial market development, which is expected under the description of the q-theory. Prombutr, Phengpis, and Zhang (2012) also find support for the risk-based explanation.

Xing (2008) measures capital investment with both investment growth rates and investment-to-capital ratios and use a large US firm-level data set from 1964 to 2003. They document that the current capital investment is negatively associated with future equity returns with investment growth rates of small firms at least three times higher than the rates for large firms. Their findings are consistent with an efficient-market explanation based on q-theory, although it does not exclude the mispricing explanation.

Watanabe et al. (2012) examine whether the evidence of lower annual returns corresponding to the asset growth in previous years is present across equity markets around the world rather than using data from US firms only. A large international sample allows them to test two main alternative sources

explaining this anomaly, that is the mispricing and optimal investment (rational asset pricing). Watanabe et al. (2012) compare markets where stocks are efficiently priced with markets where they are inefficiently priced. They argue that the stronger investment growth effect in countries where stocks are less efficiently priced would support the mispricing explanation. A stronger effect in countries where prices are highly efficient would support the optimal investment explanation. Among alternative proxies, they classify countries as developed and emerging markets based on the measure of developed market status provided by the International Finance Corporation (IFC). The authors find that the asset growth effect is a worldwide phenomenon, as the negative relationship exists in a large international sample. In addition to this general result, they find that the asset growth effect is greater in developed countries' markets, where stock prices are more efficiently priced. This finding supports the optimal investment hypothesis.

Li, Becker, and Rosenfeld (2012) also provide evidence on the existence of the asset growth effect in international markets. They find a high level of return predictive power for asset growth-related measures in all developed markets of the MSCI World Universe, especially for two-year total asset growth rates. However, little significant return predictive power for these measures is found in emerging markets either by country or as a group.

This study revisits the asset-growth effect in emerging markets to analyze whether or not the asset-growth effect exists across emerging markets in recent years. Therefore, our first hypothesis is as follows:

Hypothesis 1: *There is a significant and negative relationship between the asset growth and future stock returns in emerging markets.*

Watanabe et al. (2012) find a weaker asset-growth effect in emerging markets relative to developed markets. This evidence, which is inconsistent with the mispricing argument, is somewhat surprising in emerging markets because of the fact that emerging markets operate with imperfect efficiency (for a brief literature review, see Kearney 2012), asymmetric information between managers and investors, and, thus, higher agency problems. If those factors derive the asset growth, then we expect to see a significant and negative relationship between the asset growth and stock returns within our sample of emerging markets. On the other hand, the alternative optimal investment hypothesis finds support in Harvey, Lins, and Roper (2004). The authors discuss the role of domestic short-term debt and global debt and show that issues of internationally syndicated loans in emerging markets mitigate the overinvestment problem. Their evidence supports the idea of the monitoring role of such debt by creating higher value. This suggests that it is highly likely that the asset-growth effect is indeed weaker in emerging markets, making any insignificant asset-growth effect an indication of the optimal investment hypothesis.

The Asset-Growth Effect and the Global Financial Crisis

We extend our analysis and investigate the asset growth effect in two different time periods. In particular, we focus on recent financial crisis years and compare the existence of the asset-growth effect between normal and crisis periods. Since the financial crisis has effects globally on developed as well as emerging countries, our analysis on stocks traded in emerging markets provides the opportunity to identify whether mispricing or optimal investment explanation would find support in those countries.

The recent global crisis showed its effect on GDP growth rates in advanced economies and then spread quickly to emerging economies. Blanchard, Das, and Faruqee (2010) demonstrate that economic outcome in the fourth quarter of 2008 and the first quarter of 2009 decreased 7.2% and 8.3% annually in advanced economies, and 1.9% and 3.2% annually in emerging economies. The effect was worse on emerging markets' stock markets with a median drop of 57% and sovereign spreads with a 462 basis points (IMF, 2010).[1] Sources of financing for investments in most of the emerging markets are generated by the arbitrage opportunities that rose from the discrepancy between interest rates and exchange rates. Blanchard, Das, and Faruqee (2010) explain that emerging countries were affected by the crisis through two channels: a sharp decrease in exports and a sharp decrease in net capital flows. It is obvious that the financial crisis created an important shock to the supply of external financing,

especially causing the real private sector credit growth (in percent of GDP) to collapse (IMF Report 2010) and the line of credits to decline and spreads to increase (Greenlaw et al. 2008). To capture how emerging stock markets were also affected by the global financial crisis, we compare the stock turnover ratio between developed and emerging markets and annual averages of stock turnover ratio and stock market return for the sample of emerging countries during the period from 2005 to 2013 (see Figures S1a and S1b, available online). While the stock turnover, on average, in developed markets experiences a slight decrease in 2008, the drop is severe for stocks, on average, in emerging markets. In emerging markets, both stock turnover ratio and stock market return experienced a sharp decline in 2008, showed an upward trend in 2009, but continued to decline in later years.

During the global financial crisis period, tightening credit conditions and liquidity problems even for firms not borrowing directly from foreign financial institutions (Tong and Wei 2011) caused a dramatic increase especially in the cost of long-term external financing for firms in emerging markets. Furthermore, financial institutions and investors become risk-averse during financial crises periods (Alves and Francisco 2015) to be away from riskier investments. Thus, we expect that stock market participants will have a chance to better evaluate firms' (over)investments. Thus, we should expect to see a stronger asset-growth effect during the crisis years relative to other years.

Duchin, Ozbas, and Sensoy (2010) test "the standard model of investment with financing frictions" by arguing that firms relying more on external financing and keeping less internally available funds have to cut their investments more during the crisis period than firms holding high internally reserved financing to reduce their risks. The implication of this study for our analysis is that firms with higher growth in assets are those relying on external financing and will be affected by financial turmoil more. Köksal and Orhan (2013) show that risk measurement technique, VaR, estimates the potential market risk of emerging markets better than the risk of developed countries during the global financial crisis. Even though prices are assumed to be less efficient in those markets relative to developed economy markets, the stock prices during the global financial crisis are better auto-correlated with the prices in previous periods. Therefore, the reaction of the stock prices during the crisis years to the growth in assets in the previous period will be more informative to identify whether mispricing or optimal investment derive the results. Thus, our second hypothesis is:

Hypothesis 2: *There is a significant association between the asset growth effect and the global financial crisis period.*

It is clear that the possible explanation for the asset growth effect as optimal investment or mispricing depends on stock price informativeness and efficiency. A stronger asset growth effect in crisis years would provide support to the mispricing explanation while a weaker effect would indicate toward the optimal investment explanation. Thus, according to the optimal investment explanation, we should observe a positive or no further effect associated with the past asset growth in the crisis years because firms with lower cost of capital should be affected less by the market downturn.

However, the global financial crisis tightens possible credit conditions and increases the cost of external financing dramatically. Then, the market will have the chance to better evaluate firms' (over) investments. Based on the mispricing idea, higher investments right before the crisis year should cause higher decreasing in stock prices during the crisis year because markets would not evaluate the quality of such firms correctly during the normal periods. Thus, the asset growth effect occurs because of higher optimism over higher investments and favorable external financing conditions, and then the price drop should be severe during the crisis period.

Investor Protection and the Asset Growth Effect

We also investigate the heterogeneity of the asset growth effect during the crisis period across emerging markets. One factor that can have an impact on price informativeness is the investor protection available for shareholders and creditors in those countries. Studies that focus on country-level governance, such as Claessens and Laeven (2003), Rajan and Zingales (2003), Djankov et al. (2008) explain that in countries that have better creditor, shareholder, and property rights, the financial

systems are organized well and are more developed, consisting of a higher number of financing choices in comparison to the financial systems in countries with weaker legal environments.

Claessens and Yurtoglu (2013) show large differences between advanced and emerging economies from an economic and financial development perspective as well as in terms of level of stock market development. Highly developed financial markets are specific to advanced economies, with stable and prosperous economic and financial environments and well organized and developed financial systems, compared to developing country markets. Therefore, any premium from governance is highly unlikely to be received in advanced economies, as there is no risk factor that is priced.

Investigating stock market returns in the country-level governance context, Narayan, Sharma, and Thuraisamy (2015) find that country-level governance can be used to predict stock market returns in countries that have poor governance quality whereas there is no evidence for this in countries with well-developed country-level governance. This finding implies that investors can use the information contained in country-level governance indicators to construct profitable portfolio strategies in countries with poor quality governance.

Lin, Massa, and Zhang (2014) examine the relation between country-level governance and the process incorporation of information into stock markets, namely the stock price informativeness. Semi-public information is referred to as superior information that is obtained from informed judgments or better skills at processing public information. In a situation where public information is noisier, meaning it is less reliable with higher uncertainty, there is stronger incentive to generate semipublic information. This situation would apply to firms in countries with relatively poor country-level governance as the cash flows of these firms contain more risk due to the expropriation risk, due to being more advantageous for firms to hide information and due to firms investing less. Because of these reasons, firm disclosure quality is lower and public information is less trustworthy, providing a stronger incentive for institutional investors to make use of semipublic information while trading. This leads to an increase in the degree of stock prices reflecting relevant available information. Therefore price informativeness should be greater in countries that have lower quality of country-level governance.

Dal Bianco, Amini, and Signorelli (2017) find that the effects of the global financial crisis across emerging economies become severe with the interrelationship between financial and institutional development. Therefore, we would expect the strength of the asset-growth effect during the crisis years to deviate across countries with higher and lower levels of protection provided to the shareholders or creditors. Our third hypothesis is as follows:

Hypothesis 3: *The significant association between the asset-growth effect and the global financial crisis period is relevant in high (low) level of investor protection.*

Lin, Massa, and Zhang (2014) look at how the quality of country governance affects investors processing information, which leads to price informativeness. Their results reveal better price informativeness in countries with poor quality of country-level governance because public information is less reliable in those countries and market participants, such as asset managers and analysts ensure price informativeness efficiently. In their study, Lin, Massa, and Zhang (2014) also examine the relationship between country governance and price informativeness during crisis period and find significant differences between crisis and normal periods. Thus, a stronger asset growth effect during crisis years in countries that have relatively poor quality of country governance would support optimal investment hypothesis.

On the other hand, Francis et al. (2013) find that firms in emerging countries with stronger investor protection have access to external financing with better conditions to efficiently allocate their investments. Agency problems in countries with lower protection of investors, shareholders, or creditors are more pressing because they may not have the power to control overinvestment by managers. Hence, the asset-growth effect during the crisis years would potentially become severe in emerging countries with low investor protection if mispricing hypothesis receives empirical support. In case of having empirical support for the optimal investment hypothesis, we should expect to

observe the significant association between the asset growth effect and the crisis period in emerging countries with high investor protection.

Data and Methodology

The sample includes emerging countries identified based on the development status of countries by the IFC. We collect stock market and financial data to calculate our variables from Thomson-Financial Worldscope/Datastream. Countries with available country governance data and with sufficient number of firms are included in the sample. Financial firms and utilities are excluded from the sample because those industries are highly regulated and have different reporting systems (Watanabe et al. 2012). The sample period is from 2005 to 2013 to be able to investigate the presence of the asset growth effect during the recent financial crisis, which started in the United States in mid-2007 and also affected stock markets around the world, including those of emerging markets. All firm-level variables are winsorized at the top and bottom 1% level to control for the influence of outliers.

Our major variable to measure the asset growth rate is the percentage change in total assets from the end of year t–2 to the end of year t–1.

$$Asset\ Growth_{t-1} = \frac{Total\ assets_{t-1}}{Total\ assets_{t-2}} - 1$$

We use Ordinary Least Square (OLS) regressions to observe the effect of asset growth on annual holding period stock returns (in US dollars) in a year t. Firms' stock returns are computed for a year holding period from beginning of January to end of December in year t. The annual holding period market return (MARKET), computed within the same period, is included in the model. Consistent with the model used by Titman, Wei, and Xie (2013), we include a number of control variables for the most important firm characteristics that have predictive value on stock returns. These variables include size, value, momentum, and market returns. In order to control for size (LnMV_{t-1}), the natural logarithm of market capitalization is computed at the end of year t–1. The natural logarithm of the ratio of the book value of equity to the market value of equity for the year ending in t–1 (LnBM_{t-1}) is the variable used to control for the value effect. The variable to control for the momentum effect (MOM_{t-1}) is constructed as the holding period return from July until November in year t–1. All variables are measured in US dollars.

The equation of the multivariate OLS regression is shown below:

$$Return_{ijt} = \beta_1 + \beta_2 LnMV_{ijt-1} + \beta_3 LnBM_{ijt-1} + \beta_4 MOM_{ijt-1} + \beta_5 MARKET_{jt} + \beta_6 AG_{ijt-1} + \sum \beta(Country,\ Industry,\ Year\ or\ Firm,\ Year) + \varepsilon_{ijt}$$

where i, j, and t represent firm, country, and year, respectively. With this model, we investigate the existence of the asset growth effect. In alternative regressions, we include alternative combinations of country, industry, and year dummies to control for potential differences. Moreover, we also run our basic regression by including firm and year fixed effects to check for the robustness of our results. In all regressions, we calculate robust standard errors clustered at the firm level. For the existence of the asset growth effect, the estimated coefficient β_6 is expected to be negative, which indicates that an increase in asset growth rate leads to lower returns.

We use a dummy variable to identify the effect of the years of crisis to investigate how the period of the financial crisis alters the asset-growth effect. We determine crisis year by looking at the sample mean and median of firms' annual holding period returns. During the sample period of 2005–2013, both these statistics are negative in 2008 and 2011. Therefore, we create a dummy variable including years 2008 and 2011 separately and together. We also include year 2007 in some combinations because the crisis started in that year. Dooley and Hutchison (2009) show that the reaction of emerging markets to the United States turmoil that started early 2007 was very strong. The year 2009 was

considered as being part of the financial crisis period in many studies (Dabrowski, Smiech, and Papiez 2015). However, the average holding period return in that year is positive and the highest for the entire sample period. This could be because of the short-lived recovery the US and international stock markets experienced during this year. Moreover, Wan and Jin (2014) show that the recovery of emerging markets after severe crises was faster than that of developed markets. This quick recovery may have a positive effect on the returns after the first half of the crisis in 2008. To observe whether the asset growth effect exists during the crisis period, we use an interaction variable between the dummy for the crisis years and the asset growth. Then, the model used is as follows:

$$Return_{ijt} = \beta_1 + \beta_2 LnMV_{ijt-1} + \beta_3 LnBM_{ijt-1} + \beta_4 MOM_{ijt-1} + \beta_5 MARKET_{jt} + \beta_6 AG_{ijt-1} + \beta_7 Crisis + \beta_8 AG_{ijt-1} * Crisis + \sum \beta(Country,\ Industry,\ Year\ or\ Firm,\ Year) + \varepsilon_{ijt}$$

Negative and significant estimated coefficients for β_6 and β_8 will provide evidence for a stronger asset growth effect during the crisis period relative to normal periods. A negative and significant estimated coefficient of β_8 only during the crisis period will indicate that the asset growth effect exists during the crisis period, but not in other periods.

Next, we investigate whether our main relationships hold in countries with high or low shareholder protection and with low or high creditor rights. Therefore, we create subsamples and run our models shown above for these separate subsamples. If the mispricing is the main explanation for the asset growth in emerging markets, we expect to see the estimated coefficients of β_6 and/or β_8 to be negative in low governance countries.

Table 1 reports the summary statistics of 26 sample emerging countries with available data. In total, there are 58,802 observations in our sample, with China accounting for the highest number of observations (11,534), followed by Taiwan with 8,707 observations. India, Malaysia, and South Korea are the other countries with more than 5,000 observations. Colombia, Czech Republic, Jordan, and Venezuela are covered in the sample with less than 100 observations. This variation in the representation of countries indicates the importance of controlling country fixed effects in our regressions.

The average annual return over the sample period is positive, namely 25.9%. This is true for all sample countries, except Jordan, which is the only country experiencing a negative average return (−3.9%). Chinese firms have, on average, the highest annual holding return. Sample average for the asset growth is 17.4%, and all emerging countries, as expected, perform, on average, positive growth during the sample period.

We measure country level investor protection for shareholders and creditors with two separate proxies: shareholder rights and creditor rights indices. We use the shareholder rights index revised by Djankov et al. (2008) for capturing the legal protection provided to minority shareholders against expropriation by corporate insiders. According to this index, Brazil, India, Malaysia, and South Africa provide the highest protection with the score of 5, while China, Jordan, and Venezuela provide the lowest protection with the score of 1 to minority shareholders. Our proxy for protection of creditors is the creditor rights index used by Djankov, McLiesh, and Shleifer (2007). This index has four components to capture the powers of secured lenders during bankruptcy (please see detail information in Djankov, McLiesh, and Shleifer 2007: 302). Therefore, the highest score is supposed to be 4 for a country having all these four components. However, the highest score among our sample of emerging countries is 3, indicating a somewhat weaker protection provided to creditors in emerging countries. However, there is still variation in creditor rights indices across our sample countries to identify the heterogeneity in creditor protection.

Table 2 presents the sample descriptive statistics of all variables we used in the analyses per year. A striking observation is the average negative return of −50.7% in 2008, which hints at the impact of the financial crisis on this result. The average return is also negative in 2011, with −16.7%. The median returns in these two years are also negative and little larger than mean values. The average return is the highest in 2009.

Table 1. Sample countries. This table reports the number of observations and the mean values of annual holding period return, the asset growth as well as two investor protection indices; shareholder protection index and creditor rights. The sample of emerging countries is identified based on the development status of countries by the IFC. Firms' stock returns are computed for a year holding period from beginning of January to end of December in year t. Asset growth rate is represented by the percentage change in total assets from the end of year t-2 to the end of year t-1. Shareholder rights and creditor rights are two proxies to measure investor protection. For both indices, the value of 0 stands for the weakest governance, and 5 for shareholder protection and 3 for creditor rights refer to the strongest governance. The sample period is from 2005 to 2013.

Countries	# of Obs.	Annual Holding Return$_t$	Asset Growth$_{t-1}$	Region	Shareholder Rights	Creditor Rights
Argentina	389	0.144	0.059	Latin America	2	1
Brazil	1451	0.387	0.252	Latin America	5	1
Chile	963	0.145	0.140	Latin America	4	2
China	11534	0.395	0.233	Asia	1	2
Colombia	98	0.301	0.194	Latin America	3	0
Czech Republic	53	0.115	0.031	Eastern Europe	4	3
Egypt	251	0.273	0.126	Africa	3	2
Hungary	179	0.144	0.097	Eastern Europe	2	1
India	7371	0.197	0.188	Asia	5	2
Indonesia	1980	0.313	0.169	Asia	4	2
Israel	908	0.210	0.175	Asia	4	3
Jordan	65	–0.039	0.058	Asia	1	1
Malaysia	6406	0.159	0.125	Asia	5	3
Mexico	797	0.212	0.086	Latin America	3	0
Pakistan	610	0.237	0.133	Asia	4	1
Peru	483	0.428	0.197	Latin America	4.5	0
Philippines	1036	0.397	0.243	Asia	4	1
Poland	1377	0.241	0.258	Eastern Europe	2	1
Russia Federation	340	0.245	0.246	Eastern Europe	0.4	2
South Africa	1911	0.155	0.269	Africa	5	3
South Korea	6903	0.255	0.171	Asia	4.5	3
Sri Lanka	156	0.298	0.224	Asia	4	2
Taiwan	8707	0.199	0.099	Asia	3	2
Thailand	3320	0.274	0.140	Asia	4	2
Turkey	1431	0.284	0.165	Eastern Europe	3	2
Venezuela	83	0.357	0.291	Latin America	1	3
Total	58802	0.259	0.174		3.48	2.14

Results

The Asset-Growth Effect

We report the results of our multivariate regressions for the asset-growth effect for the entire sample period in Table 3. The results show that for all variables, with the exception of the asset growth rates, the estimated coefficients are statistically significant. Although for most regressions with different combinations of country, industry, and year dummies, the relationship between the growth in assets and stock returns is negative, consistent with our prediction, the coefficient is not statistically significantly different from zero.

Therefore, we do not observe an asset growth effect among the emerging economies for the period 2005–2013, as that found by Watanabe et al. (2012). However, our results complement the findings of

Table 2. Sample descriptive statistics by year. This table reports summary statistics with the number of observations, mean, median and standard deviation per year for the following variables: $Return_t$ is firms' stock returns computed for a year holding period from beginning of January to end of December in year t; Asset growth (AG_{t-1}) is the percentage change in total assets from the end of year t–2 to the end of year t–1; $LnMV_{t-1}$ the natural logarithm of firms' market capitalization; $LnBM_{t-1}$ is the natural logarithm of the ratio of the book value of equity to the market value of equity; MOM_{t-1} is the momentum effect, which is the five month firms' holding period return from July until November; $MARKET_t$ is the annual holding period market return. All variables are measured in the currency of US Dollar. The sample period is from 2005 to 2013.

	$Return_t$	Asset Growth (AG_{t-1})	$LnMV_{t-1}$	$LnBM_{t-1}$	MOM_{t-1}	$MARKET_t$
			2005 (N = 5674)			
Mean	0.254	0.197	11.096	13.646	–0.036	0.189
Median	0.030	0.130	11.185	13.592	–0.064	0.029
StdDev	0.816	0.439	1.988	0.949	0.437	0.269
			2006 (N = 6108)			
Mean	0.455	0.148	11.236	13.589	0.042	0.447
Median	0.269	0.074	11.293	13.580	–0.042	0.305
StdDev	0.769	0.500	1.984	0.960	0.544	0.435
			2007 (N = 6345)			
Mean	0.687	0.225	11.516	13.419	0.141	0.513
Median	0.325	0.130	11.559	13.426	0.061	0.385
StdDev	1.058	0.545	1.983	0.962	0.539	0.465
			2008 (N = 6709)			
Mean	–0.507	0.297	11.879	13.181	0.453	–0.540
Median	–0.565	0.169	11.887	13.242	0.273	–0.562
StdDev	0.296	0.639	2.046	1.045	0.721	0.088
			2009 (N = 6099)			
Mean	1.074	0.064	11.497	13.884	–0.209	0.797
Median	0.885	–0.009	11.564	13.922	–0.249	0.797
StdDev	0.986	0.500	2.026	0.972	0.405	0.261
			2010 (N = 6233)			
Mean	0.341	0.185	11.772	13.364	0.513	0.220
Median	0.194	0.102	11.871	13.408	0.420	0.204
StdDev	0.656	0.513	2.164	1.018	0.639	0.186
			2011 (N = 6187)			
Mean	–0.167	0.234	12.065	13.284	0.018	–0.192
Median	–0.240	0.151	12.229	13.316	–0.030	–0.184
StdDev	0.455	0.547	2.183	1.006	0.431	0.135
			2012 (N = 7787)			
Mean	0.220	0.105	11.641	13.678	–0.012	0.187
Median	0.106	0.034	11.614	13.719	–0.052	0.144
StdDev	0.556	0.536	2.102	0.971	0.374	0.196
			2013 (N = 7660)			
Mean	0.093	0.126	11.598	13.611	0.092	0.002
Median	–0.001	0.071	11.583	13.646	0.045	–0.031
StdDev	0.543	0.462	2.153	0.970	0.376	0.151
			Total (N = 58802)			
Mean	0.259	0.174	11.598	13.519	0.113	0.169
Median	0.069	0.095	11.599	13.545	0.017	0.132
StdDev	0.829	0.528	2.093	1.006	0.551	0.456

Table 3. Asset growth effect. This table reports pooled OLS regression results to obtain the effect of asset growth on firms' stock returns ($Return_t$), which is computed for a year holding period from beginning of January to end of December in year *t*. $LnMV_{t-1}$ the natural logarithm of firms' market capitalization. $LnBM_{t-1}$ is the natural logarithm of the ratio of the book value of equity to the market value of equity. MOM_{t-1} is the momentum effect, which is the five month firms' holding period return from July until November. $MARKET_t$ is the annual holding period market return. Asset growth (AG_{t-1}) is the percentage change in total assets from the end of year *t*–2 to the end of year *t*–1. All variables are measured in the currency of US Dollar. The sample period is from 2005 to 2013. *, **, * denote statistical significance at 1%, 5%, and 10% levels, respectively.**

$LnMV_{t-1}$	–0.006***	–0.013***	–0.008***	–0.015***	–0.172***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.009]
$LnBM_{t-1}$	0.037***	0.045***	0.042***	0.050***	0.220***
	[0.003]	[0.004]	[0.004]	[0.004]	[0.010]
MOM_{t-1}	0.036***	0.033***	0.034***	0.032***	0.016**
	[0.007]	[0.007]	[0.007]	[0.007]	[0.008]
$MARKET_t$	0.956***	0.943***	0.953***	0.939***	0.796***
	[0.017]	[0.016]	[0.017]	[0.016]	[0.018]
AG_{t-1}	–0.001	–0.001	–0.001	–0.001	0.006
	[0.006]	[0.006]	[0.006]	[0.006]	[0.008]
Constant	–0.366***	–0.561***	–0.466***	–0.617***	–0.989***
	[0.058]	[0.067]	[0.066]	[0.074]	[0.207]
Adjusted *R*-sq	0.365	0.37	0.367	0.372	0.41
Observations	58802	58802	58802	58802	58802
Country	No	Yes	No	Yes	No
Industry	No	No	Yes	Yes	No
Year	Yes	Yes	Yes	Yes	Yes
Firm	No	No	No	No	Yes

Titman, Wei, and Xie (2013) that document a strong asset growth effect only among the developed, and not also for the developing economies.

The Asset-Growth Effect and the Financial Crisis

Table 4 presents the results of our multivariate regressions for the effect of the financial crisis on the relationship between the asset growth rate and future stock returns. First, relevant for our research is the output of the second model that includes a dummy variable for years of the crisis, separately and together, and also interactions terms of this variable and the asset-growth rate. For all interactions variables, the estimated coefficients are negative and statistically significant. This provides evidence that the asset-growth effect is stronger during the crisis period relative to more normal periods. Moreover, for the peak year of the Global Financial Crisis, 2008, both coefficients for the dummy variable and interaction term have a negative sign and are statistically significant (at the 1% level) which is a strong indicator for the existence of the asset growth effect during the crisis period, but not in other periods.

A similar conclusion is reached by using the first model with country, industry and year fixed effects only for the years of the crisis. The coefficient of the variable "asset growth rate" has a negative sign and is statistically significant (at the 1% level) only for year 2008, separately and together with 2011 (see Table S1, available online).

This evidence supports our second hypothesis on the significant association between the asset-growth effect and the global financial crisis period. The logic is that an episode of crisis gives investors the

Table 4. Crisis period and asset growth effect. This table reports pooled OLS regression results with country, industry and year fixed effects to obtain the effect of asset growth during the crisis periods on firms' stock returns (Return$_t$), which is computed for a year holding period from beginning of January to end of December in year *t*. Asset growth (AG$_{t-1}$) is the percentage change in total assets from the end of year *t*–2 to the end of year *t*–1. Crisis is a dummy variable to identify the crisis period. LnMV$_{t-1}$ the natural logarithm of firms' market capitalization. LnBM$_{t-1}$ is the natural logarithm of the ratio of the book value of equity to the market value of equity. MOM$_{t-1}$ is the momentum effect, which is the five month firms' holding period return from July until November. MARKET$_t$ is the annual holding period market return. All variables are measured in the currency of US Dollar. The sample period is from 2005 to 2013. *, **, * denote statistical significance at 1%, 5%, and 10% levels, respectively.**

LNMV$_{t-1}$	**–0.015*** **	**–0.015*** **	**–0.015*** **	**–0.015*** **	**–0.015*** **
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
LnBM$_{t-1}$	0.050***	0.050***	0.050***	0.050***	0.050***
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
MOM$_{t-1}$	0.032***	0.032***	0.032***	0.032***	0.032***
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
MARKET$_t$	0.939***	0.940***	0.939***	0.939***	0.939***
	[0.016]	[0.016]	[0.016]	[0.016]	[0.016]
AG$_{t-1}$	0.005	0.001	0.007	0.01	0.012
	[0.007]	[0.006]	[0.007]	[0.008]	[0.008]
Crisis (2008)	–0.047***				
	[0.014]				
Crisis (2008)*AG$_{t-1}$	–0.038***				
	[0.009]				
Crisis (2011)		–0.028**			
		[0.012]			
Crisis (2011)*AG$_{t-1}$		–0.024*			
		[0.013]			
Crisis (2007&2008)			–0.050***		
			[0.014]		
Crisis (2007&2008)*AG$_{t-1}$			–0.029**		
			[0.012]		
Crisis (2008&2011)				–0.025**	
				[0.012]	
Crisis (2008&2011)*AG$_{t-1}$				–0.038***	
				[0.009]	
Crisis (2007,2008&2011)					–0.026**
					[0.012]
Crisis (2007,2008&2011)*AG$_{t-1}$					–0.034***
					[0.011]
Constant	–0.618***	–0.618***	–0.617***	–0.620***	–0.619***
	[0.075]	[0.075]	[0.075]	[0.075]	[0.075]
Adjusted *R*-sq	0.372	0.372	0.372	0.372	0.372
Observations	58802	58802	58802	58802	58802

possibility to improve their assessment of the real value of firms' investment even in those countries where the agency problems and asymmetric information are commonly assumed to be higher.

Table 5. Crisis period and asset growth effect: The role of stock turnover ratio, firm size and industry. This table reports pooled OLS regression results with country, industry and year fixed effects to obtain the roles of several firm characteristics in the effect of asset growth during the crisis periods on firms' stock returns ($Return_t$), which is computed for a year holding period from beginning of January to end of December in year *t*. Stock turnover ratio is the ratio of the value of total shares traded to market capitalization, and firm size is based on market capitalization in US Dollar. Firms are classified into three groups using the 30th and 70th percentiles. The list of high R&D industries is provide in footnote 1. June of Asset growth (AG_{t-1}) is the percentage change in total assets from the end of year *t*–2 to the end of year *t*–1. Crisis is a dummy variable to identify the crisis period, which includes years 2008 and 2011. $LnMV_{t-1}$ the natural logarithm of firms' market capitalization; $LnBM_{t-1}$ is the natural logarithm of the ratio of the book value of equity to the market value of equity. MOM_{t-1} is the momentum effect, which is the five month firms' holding period return from July until November. $MARKET_t$ is the annual holding period market return. All variables are measured in the currency of US Dollar. The sample period is from 2005 to 2013. *, **, * denote statistical significance at 1%, 5%, and 10% level, respectively.**

	Stock Turnover Ratio			Firm Size			Industry	
	Low	Medium	High	Small	Medium	Large	High-R&D	Others
$LNMV_{t-1}$	–0.008**	–0.011***	–0.067***	–0.077***	–0.277***	–0.148***	–0.018***	–0.013***
	[0.004]	[0.003]	[0.006]	[0.006]	[0.013]	[0.007]	[0.003]	[0.003]
$LnBM_{t-1}$	0.026***	0.049***	0.114***	0.109***	0.137***	0.079***	0.050***	0.049***
	[0.006]	[0.006]	[0.009]	[0.006]	[0.008]	[0.009]	[0.006]	[0.005]
MOM_{t-1}	0.016	0.057***	0.02	0.027***	0.023**	0.002	0.051***	0.022**
	[0.013]	[0.011]	[0.012]	[0.009]	[0.011]	[0.015]	[0.010]	[0.010]
$MARKET_t$	0.743***	0.821***	1.078***	0.600***	0.795***	1.039***	0.951***	0.927***
	[0.033]	[0.023]	[0.028]	[0.024]	[0.027]	[0.033]	[0.022]	[0.022]
AG_{t-1}	0.027**	0.014	–0.013	–0.032***	–0.031**	–0.021*	0.004	0.015
	[0.012]	[0.011]	[0.017]	[0.012]	[0.013]	[0.011]	[0.011]	[0.011]
Crisis	0.058***	–0.095***	–0.096***	0.004	–0.047**	–0.02	–0.076***	0.007
	[0.016]	[0.018]	[0.033]	[0.017]	[0.020]	[0.025]	[0.018]	[0.015]
Crisis*AG_{t-1}	–0.046***	–0.047***	–0.013	–0.001	0.000	–0.008	–0.024*	–0.052***
	[0.016]	[0.013]	[0.022]	[0.014]	[0.019]	[0.016]	[0.014]	[0.014]
Constant	–0.429***	–0.573***	–0.830***	–1.061***	0.824***	0.829***	–0.516***	–0.658***
	[0.122]	[0.125]	[0.191]	[0.115]	[0.253]	[0.186]	[0.116]	[0.092]
Adjusted *R*-sq	0.31	0.396	0.408	0.365	0.497	0.46	0.39	0.362
Observations	17423	23250	17441	17653	23477	17612	24175	34627

The Asset-Growth Effect and the Role of Firm Characteristics

In addition to the full sample of firms from emerging countries, we perform the same pooled OLS regressions on subsamples of firms classified into three groups according to their size and stock turnover ratios, using the 30th and 70th percentiles. Moreover, similar to Polk and Sapienza (2009), we consider the R&D intensity, which is measured by the ratio of R&D expenditures to total assets, and run the same regression on two subsamples of firms grouped into high R&D intensive and others, based on the mean of R&D expenditures by 2-digit SIC industry classification.[2] The results of these sensitivity tests provide support for the robustness of our findings on the asset-growth effect and are reported in Table 5.

When considering the first firm characteristic, the coefficient estimates for the interaction variable between the crisis dummy and the asset growth rate for the subsamples with low, medium, and high stock turnover ratios are −0.046, −0.047, and −0.013, respectively, which is in line with our previous findings for the full sample. However, only the coefficients estimates for the first two subsamples are significant at the 1% level. This provides evidence for the existence of the asset growth effect during the crisis years only for those firms in emerging markets with low and medium ratios of the value of total shares traded to market capitalization.

R&D intensity has also an impact of the size of the asset growth effect during the crisis period. Coefficient estimates of the interaction term for both subsamples of high R&D intensive and other firms exhibit the expected negative sign and are statistically significant. However, the coefficient estimate for the subsample of firms in less R&D intensive industries has twice the size and is also statistically significant at 1%.

The coefficient estimates of the asset growth measure are negative and statistically significant for all small, medium, and large firms. This supports the findings of Cooper, Gulen, and Schill (2010) that the asset growth rate maintains explanatory power across showed all three capitalization levels. In addition, small firms exhibit the largest coefficient estimate (and also the only one significant at the 1% level). This may suggest that although the asset growth effect is not only a small-company-based anomaly, is somewhat more related to smaller companies, consistent to the findings of Li, Becker, and Rosenfeld (2012).

Investor Protection and the Asset-Growth Effect

We report the results of our multivariate regressions for the role of investor protection in the relationship between the asset-growth effect and the financial crisis period in Table 6. The first two columns of the table report the results using the shareholders rights index, and the columns 3 and 4 report those for the creditor rights index. The estimated coefficient of the interaction variable on the association between asset-growth effect and years of crisis is negative and significant only for those emerging markets with a low protection of shareholders. Similar results are reported when assessing the role of the creditor protection of the asset growth effect during the crisis periods. Only countries with a low value of the creditor rights index exhibit negative and statistically significant estimated coefficients for the interaction variable between the asset growth and years of crisis.[3]

Overall, our findings on the relevance of the investor protection level on the effect of asset growth on stock returns during the crisis years show that the asset-growth effect is severe in those emerging countries with a lower score of both indices of shareholders and creditors rights, therefore providing support to the mispricing explanation.

Conclusions

In this study, we examine the asset growth effect, which is identified as the relationship between the growth rate in assets and future stock returns. The literature has provided evidence for a stronger negative relationship for firms in the United States and also in other developed countries. Two

Table 6. Shareholder and creditor protection, crisis period and asset growth effect. This table reports pooled OLS regression results with country, industry and year fixed effects to obtain the role of protection provided for shareholders and creditors at the country level in the effect of asset growth during the crisis periods on firms' stock returns (Return$_t$), which is computed for a year holding period from beginning of January to end of December in year t. Asset growth (AG$_{t-1}$) is the percentage change in total assets from the end of year t–2 to the end of year t–1. Crisis is a dummy variable to identify the crisis period, which includes years 2008 and 2011. LnMV$_{t-1}$ the natural logarithm of firms' market capitalization; LnBM$_{t-1}$ is the natural logarithm of the ratio of the book value of equity to the market value of equity. MOM$_{t-1}$ is the momentum effect, which is the five month firms' holding period return from July until November. MARKET$_t$ is the annual holding period market return. All variables are measured in the currency of US Dollar. Low (High) shareholder protection countries are those whose indices are lower or equal to (higher) than the median of investor protection index. The sample period is from 2005 to 2013. *, **, * denote statistical significance at 1%, 5%, and 10% level, respectively.**

	SHAREHOLDER PROTECTION		CREDITOR PROTECTION	
	Low	High	Low	High
LNMV$_{t-1}$	–0.026***	–0.003	–0.018***	–0.008*
	[0.003]	[0.003]	[0.002]	[0.004]
LnBM$_{t-1}$	0.045***	0.068***	0.035***	0.112***
	[0.005]	[0.006]	[0.004]	[0.008]
MOM$_{t-1}$	0.034***	0.030***	0.033***	0.019*
	[0.009]	[0.012]	[0.009]	[0.011]
MARKET$_t$	0.817***	1.245***	0.852***	1.168***
	[0.017]	[0.036]	[0.016]	[0.072]
AG$_{t-1}$	0.022**	–0.014	0.015*	–0.014
	[0.010]	[0.012]	[0.009]	[0.013]
Crisis	0.041***	–0.027	–0.009	–0.046
	[0.012]	[0.025]	[0.013]	[0.033]
Crisis*AG$_{t-1}$	–0.052***	–0.006	–0.048***	–0.005
	[0.013]	[0.014]	[0.012]	[0.016]
Constant	–0.611***	–0.688***	–0.491***	–1.392***
	[0.093]	[0.125]	[0.086]	[0.160]
Adjusted R-sq	0.406	0.337	0.408	0.271
Observations	34277	24525	42538	16264

potential explanations have been provided for the asset-growth effect, mispricing (overinvestment), and q-theory (optimal investing). We test this relationship with the firm-level financial and stock returns data from 26 emerging markets in the period of 2005–2013. Our aim is to identify which one of these two explanations exists across emerging markets. We specifically focus on how this relationship would be affected by the global financial crisis years. We also consider the role of strength of the country-level protection for shareholders and creditors.

We find that a significant and negative relationship between asset growth rates and stock returns in emerging markets holds only for the 2008 financial crisis and not for the full period, for firms with low and median stock turnover ratio and also firms operating in industries with low R&D intensity. In addition, we show that this asset-growth effect during the crisis years is heterogeneous among our sample group and can be found only in those emerging markets with a low level of investor protection. Our results provide empirical support to the mispricing hypothesis of the asset-growth effect and are consistent with the evidence provided by Titman, Wei, and Xie (2004).

Our study has important implications from an investment perspective. We find that the return predictive power of asset-growth measures, documented mostly in the United States and other developed economies,

also exists in emerging markets under certain conditions, linked to financial downturn periods and the level of investor protection. Therefore, the asset-growth effect in these markets, particularly in those with lower investor protection, should also benefit from the attention of investors, in addition to other stock returns' anomalies already documented in the asset pricing literature. However, one should be cautious about the current limitations in the prediction of financial crises.

The asset-growth effect has already been analyzed in a number of studies in the literature. This study adds a new insight to the existing academic research by analyzing the moderating impact of the global crisis along with how this moderating effect is shaped within emerging markets with high and low shareholders and creditors protection. A limitation of this study can be considered to rely on standard time invariant investor protection country level indices. However, the firm-level corporate governance would be the main determinant of investors view over firms' quality rather than country-level governance variables. Unfortunately, the availability of the firm-level governance scores is scarce. Therefore, a recommendation for further research given a broader available scope would be to analyze the effect of firm-level governance on the asset growth effect across emerging markets as well as developed markets.

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Supplemental Data

Supplemental data for this article can be accessed on the publisher's website.

Notes

1. Both the IMF Report (2010) and Blanchard, Das, and Faruqee (2010) also indicate that the effect of the crisis on emerging countries was more varied, depending upon the levels of trade openness, short-term external debts, current account deficits, large foreign currency debts, and reserve holdings.

2. High R&D industries include firms in following industries; 07 Agricultural Services, 28 Chemicals and Allied Products, 35 Industrial and Commercial Machinery and Computer Equipment, 36 Electronic & Other Electrical Equipment & Components, 37 Transportation Equipment, 38 Measuring, Photographic, Medical, & Optical Goods, & Clocks, 39 Miscellaneous Manufacturing Industries, 73 Business Services, 82 Educational Services, 87 Engineering, Accounting, Research, and Management Services, 89 Services, Not Elsewhere Classified.

3. With the results for separate and combined crisis years (See Tables S2 and S3, available online), we also find negative and statistically significant coefficients for the peak of the crisis years for countries with low shareholder and creditor protection.

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